23. A device according to claim 22 wherein said microchannel comprises a plurality of gradient inducing features.

24. A device according to claim 22 wherein said gradient inducing feature is a sawtooth ridge.

25. A device according to claim 22 wherein said gradient inducing feature is a dome.

26. A device according to claim 22 wherein said gradient inducing feature has a diameter of between 1 μm and 1000 μm.

27. A device according to claim 22 wherein said magnetic material is an iron-nickel alloy.

28. A microfluidic device comprising a solid support comprising:

a) a sample inlet port;

b) at least one microchannel comprising at least one section filled with magnetic beads;

c) a sample outlet port; and

d) a detection module comprising:

i) a detection electrode;

ii) a self-assembled monolayer;

iii) a binding ligand; and

iv) a detection inlet port to receive said sample.

29. A method to process a target analyte in a sample comprising:

a) provide said target analyte labeled with a magnetic label; and

b) introducing said labeled target analyte to a microfluidic device comprising a solid support comprising:

i) a sample inlet port;

ii) at least one microchannel comprising at least one section with walls comprising magnetic beads;

iii) a sample outlet port;

under conditions whereby said labeled target analyte binds to said walls.

30. A method according to claim 29, further comprising:

a) washing away other components of said sample from said microchannel.

31. A method according to claim 29 or claim 30, further comprising treating the target analyte inside the channel.

32. A method according to claim 29 or claim 30, further comprising detecting the target analyte inside the magnetic microchannel.

33. A method according to any one of claims **29-31**, further comprising eluting the target analyte or the analysis product from said walls.

34. A method according to claim 33, wherein said elution is achieved by reversing the electromagnet.

35. A method according to claim 33, wherein said elution is achieved by ferrofluid.

36. A method according to claim 33, wherein the elution is achieved by chemical disruption.

37. A method according to claim 33, wherein the elution is achieved by thermal disruption.

38. A method according to claim 29 wherein said target analyte is nucleic acid.

39. A method according to claim 29 wherein said target analyte is protein.

40. A method according to claim 29 wherein said target analyte is cell.

41. A method according to claim 29 wherein said target analyte is labeled in a labeling chamber.

42. A method according to claim 29, wherein said target analyte is further treated in a post-treatment module.

43. A method to process a target analyte in a sample comprising:

a) providing said target analyte labeled with a magnetic label; and

b) introducing said labeled target analyte to a microfluidic device comprising a solid support comprising:

i) a sample inlet port;

ii) at least one microchannel comprising a gradient inducing feature coated with a magnetic material; and

iii) a sample outlet port;

under conditions whereby said labeled target analyte is transported toward said gradient inducing feature.

44. A method to process a target analyte in a sample comprising:

a) provide said target analyte labeled with a magnetic label; and

b) introducing said labeled target analyte to a microfluidic device comprising a solid support comprising:

i) a sample inlet port;

ii) at least one microchannel comprising at least one section filled with magnetic beads;

iii) a sample outlet port; and

iv) a detection module comprising:

1) a detection electrode

2) a self-assembled monolayer;

3) a binding ligand; and

4) a detection inlet port to receive said sample.

under conditions whereby said labeled target analyte binds to said channel.

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